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APPRENTICESHIP TRAINING

CARPENTER
Program

Alberta
MANPOWER
Apprenticeship and Trade Certification

TABLE OF CONTENTS

The Goal of Apprenticeship Training 1
Basic Requirements 2
Credits 2
Benefits 2
Directions for Prospective Apprentices 3
Apprenticeship Route Toward Certification 4
Apprenticeship Committee Structure 5
Apprenticeship Committee Members 5
Procedures for Recommending Revision(s)to the Course Outline 6
Preface 7
Safety Education 8
Subjects and Time Distribution 10

COURSE OUTLINE

First Period Subjects 11
Second Period Subjects 20
Third Period Subjects 29
Fourth Period Subjects 40
Suggested Reference Materials 48
Technical Training Schools 49
Location of Apprenticeship and Trade Certification Regional Offices 49
Trade Regulations 50

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CARPENTER TRADE

THE GOAL OF APPRENTICESHIP TRAINING

To develop a competent tradesman who, through skill and knowledge, is capable of building all types of structures.

THE PRODUCT OF APPRENTICESHIP — a graduate who will:

★ Understand the principles of sound and safe construction.

★ Know the characteristics and proper use of all building construction materials.

★ Read blueprints, do layout work and calculate quantities of materials.

★ Build various types of forms for concrete.

★ Build all types of wood framed buildings and apply exterior and interior finish of wood or wood substitute.

★ Be proficient in the safe use and maintenance of hand and power tools.

★ Be familiar with the work of other tradesmen in the building industry.

★ Perform assigned tasks in accordance with quality and production standards required in industry.

APPRENTICESHIP INFORMATION

Basic Requirements:

★ Indenture for four periods of Trade experience.

★ Attend an eight week technical training course in the first, second, third and fourth periods.

★ Fulfill the requirements for each period including 1600 hours of work experience inclusive of time spent at the training course; successfully complete the technical training course and obtain a satisfactory employer's report.

★ Education — a minimum requirement is the completion of grade 9 or a pass on an equivalent entrance examination as prescribed by the Trade regulation.

★ Age — the minimum age for apprentices is 16 years. There is no upper age limit.

Credits:

★ Accelerated patterns of apprenticeship may be granted for related technical training and/or experience.

Benefits:

★ Apprenticeship is a learning-while-earning program. During the apprenticeship period, while working at the trade, apprentices are assured by regulation of a minimum percentage of the prevailing journeyman rate: 60% during the first period, 70% during the second period, 80% during the third period, 90% during the fourth period. Progress from one rate to the next takes place only after successful completion of all the requirements for each period. (details are outlined in the Record Book).

★ All apprentices 17 years of age and older are normally eligible for training allowances while attending technical training courses. These allowances are funded by the Canada Employment and Immigration Commission.

★ Administrative procedures establishing the amount of training allowance is complex and can vary with an individual's circumstances. Contact a local Canada Employment Centre for details.

★ An apprentice who successfully completes the program will graduate with an Alberta Completion of Apprenticeship Certificate and a Certificate of Qualification. It is also possible for the graduate to obtain an Interprovincial Red Seal by passing an additional examination and so become recognized as a qualified tradesman throughout Canada.

★ The most significant benefit to the graduate apprentice is that he is well trained in technical and practical aspects of the trade and is able to make a worthwhile and productive contribution to society. Society in return, will provide an opportunity for livelihood.

DIRECTIONS FOR PROSPECTIVE APPRENTICES

★ Contact your nearest Apprenticeship and Trade Certification office for detailed information and counselling (see list of offices on page 49).

★ Obtain an application form from the Apprenticeship and Trade Certification office and neatly complete, in full, the information requested of the apprentice.

★ Persevere in the search for apprentice employment and upon obtaining employment, give the application to the employer. It should be completed and returned to an Apprenticeship and Trade Certification office forthwith.

★ Any time credit, for previous experience in the Carpenter trade, should be discussed with the employer and requested on the application forms by the employer.

★ Prepare to be called for an entrance examination following submission of your application. You will be advised of the date, time and location.

★ A contract of apprenticeship is entered into between the apprentice and the employer and should be signed within 90 days after the apprentice application has been approved. If contracts have not been issued within this time, contact the Apprenticeship and Trade Certification office.

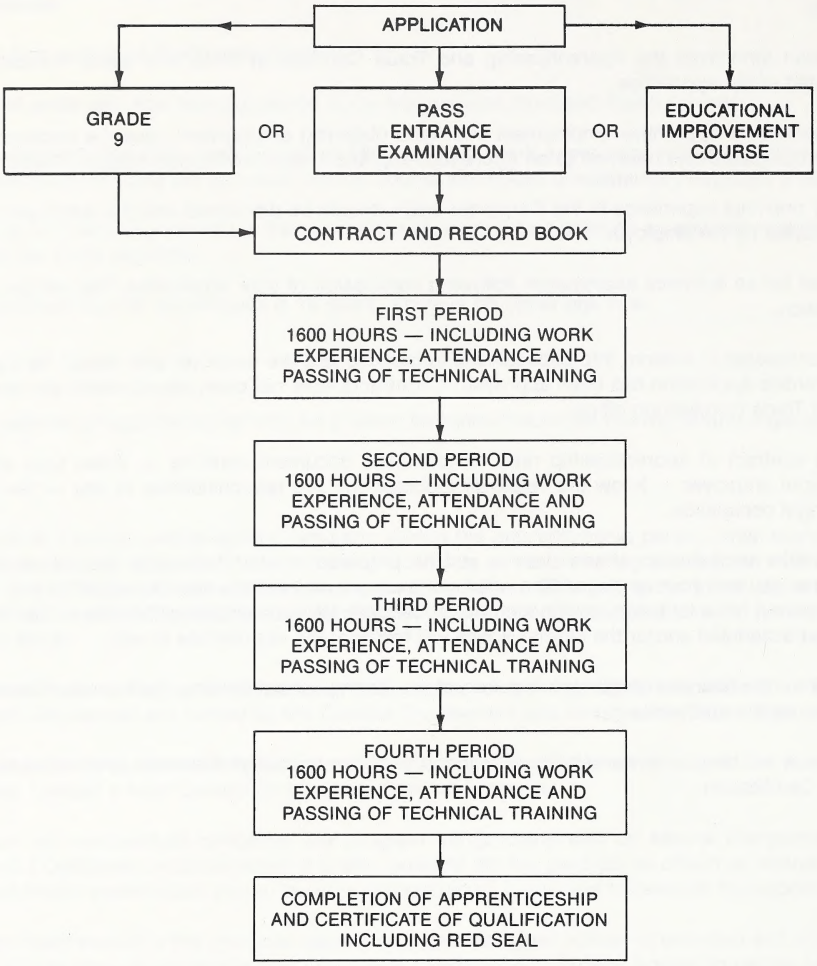
★ Before signing the contract of apprenticeship read the complete document carefully — know your obligations and responsibilities to your employer — know the employer's obligations and responsibilities to you — feel confident you have selected the right occupation.

★ Know when you will be expected to attend classes and be prepared to attend. In early May of each year, School Schedules are sent to you and your employer. The employer also receives a class selection card for you, which is to be completed and submitted for scheduling. Information on procedures also accompanies the above. Confirmation on the date you actually get scheduled and/or the Official Notice will follow at the appropriate time(s).

★ Prepare in advance for the financial obligations required of you during school training. Reference materials and school supplies are paid for by the apprentice.

★ While an apprentice, it will be your responsibility to respond promptly to mailed directions and requests from Apprenticeship and Trade Certification.

APPRENTICESHIP ROUTE TOWARD CERTIFICATION


APPLICATION
GRADE 9
OR
PASS ENTRANCE EXAMINATION
OR
EDUCATIONAL IMPROVEMENT COURSE
CONTRACT AND RECORD BOOK
FIRST PERIOD
1600 HOURS — INCLUDING WORK EXPERIENCE, ATTENDANCE AND PASSING OF TECHNICAL TRAINING
SECOND PERIOD
1600 HOURS — INCLUDING WORK EXPERIENCE, ATTENDANCE AND PASSING OF TECHNICAL TRAINING
THIRD PERIOD
1600 HOURS — INCLUDING WORK EXPERIENCE, ATTENDANCE AND PASSING OF TECHNICAL TRAINING
FOURTH PERIOD
1600 HOURS — INCLUDING WORK EXPERIENCE, ATTENDANCE AND PASSING OF TECHNICAL TRAINING
COMPLETION OF APPRENTICESHIP AND CERTIFICATE OF QUALIFICATION INCLUDING RED SEAL

APPRENTICESHIP COMMITTEE STRUCTURE

Carpenter Provincial Apprenticeship Committee

The Provincial Apprenticeship Committee for the Carpenter Trade is comprised of members from Local Apprenticeship Committees from the cities of Edmonton, Calgary, Fort McMurray, Grande Prairie, Lethbridge, Medicine Hat, Red Deer and Vermilion.

This Committee is concerned with the policies that guide the program and make recommendations to Apprenticeship and Trade Certification and the Executive Director of Apprenticeship and Trade Certification in the following areas:

- ★ Contribute current information relative to changes in the trade and requirements of industry.
- ★ Make recommendations for changes to existing trade regulations.
- ★ Assist in updating of the training program through recommendations for revisions to the course outline and attendant examinations.

Carpenter Local Apprenticeship Committee

Local Apprenticeship Committees are concerned with individuals and trade situations within a local region. Meetings are held throughout the year to make recommendations and to discuss problems relating to the apprenticeship program. Members who serve on committees are nominated by employer and labour organizations, and membership is equally divided into employer and employee representation in accordance with The Manpower Development Act.

Apprenticeship Committee Members:

Mr. A. Olson — Calgary — Employer
Mr. J. Paterson — Calgary — Employee
Mr. M. Piper — Calgary — Employee
Mr. S. Lamb — Calgary — Employee — Alternate
Mr. D. Otto — Edmonton — Employer
Mr. A. Kinasewich — Edmonton — Employer
Mr. R. Nybakken — Edmonton — Employer — Alternate
Mr. M. Semchuk — Edmonton — Employee
Mr. A. Curtis — Edmonton — Employee — Alternate
Mr. R. Casavant — Edmonton — Employee — Alternate
Mr. R. Patt — Edmonton — Additional Marker
Mr. S. Logue — Fort McMurray — Employer
Mr. M. Lord — Fort McMurray — Employee
Mr. R. Castonguay — Fort McMurray — Employee
Mr. W. Voth — Fort McMurray — Employer
Mr. A. McEwen — Grande Prairie — Employer
Mr. M. O'Connor — Grande Prairie — Employer — Alternate
Mr. H. Jantz — Grande Prairie — Employee
Mr. J. Cadieux — Grande Prairie — Employee — Alternate
Mr. A. Simons — Lethbridge — Employer
Mr. J. Bane — Lethbridge — Employer
Mr. H. Ward — Lethbridge — Employer — Alternate
Mr. B. Martinell — Lethbridge — Employee
Mr. C. Pankhurst — Lethbridge — Employee
Mr. M. Morin — Lethbridge — Employee — Alternate
Mr. G. King — Medicine Hat — Employer
Mr. E. Klose — Medicine Hat — Employer
Mr. W. Konrad — Medicine Hat — Employee
Mr. L. Rebman — Medicine Hat — Employee
Mr. U. Wunsch — Red Deer — Employer
Mr. A. Grieb — Red Deer — Employer
Mr. P. Carruthers — Red Deer — Employee
Mr. A. Wasylik — Vermilion — Employer
Mr. R. Swyripa — Vermilion — Employer — Alternate
Mr. G. Graham — Vermilion — Employee
Mr. W. Dunbar — Vermilion — Employee — Alternate

CARPENTER PROGRAM
COURSE OUTLINE

This outline has been prepared in accordance with recommendations from the Provincial Apprenticeship Committee for the Carpenter Trade in the Province of Alberta.

The outline was updated following consideration given to recommendations and suggestions from:

Local Apprenticeship Committees
Representatives from training institutes
Curriculum Sub-Committee from the Provincial Apprenticeship Committee

PROCEDURES FOR RECOMMENDING
REVISION(S) TO THE COURSE OUTLINE

Any concerned citizen or group in the Province of Alberta may make recommendations for change by writing to Apprenticeship and Trade Certification, Edmonton.

It is requested that recommendations for change refer to specific areas and state references used. Recommendations received will be placed before regular meetings of the Provincial Apprenticeship Committee.

PREFACE

The lectures, demonstrations and assignments outlined herein, are intended to familiarize and to prepare the Carpenter apprentice for the best possible performance of his occupation within the construction industry. To fulfill present day requirements and to become able to adjust to situations that will arise apart from nominal work experience during apprenticeship, it is accepted that the apprentice should appreciate and develop skills within the scope of the industry.

SHOP

The areas and projects outlined in shop sections are designed to range from introduction to tools, equipment, safety and the development of skills, to simulated construction problems encountered in industry.

THEORY

The areas outlined in the theory sections are designed to introduce or buttress and more sharply define the subject matter. When impractical for shop exercises, some areas will be taught in theory only.

BLUEPRINTS

This area of outline is designed to enable the apprentice to become able to envision, build and assemble from drawings and blueprints. He should learn to develop and transmit basic concepts to others within the industry.

TRADE MATHEMATICS

Basic Mathematics is essential for the Carpenter. Measuring for layouts, cutting of materials and calculations of areas and quantities are routine requirements of a tradesman. Instruction and participation in exercises shall relate to theory and shop assignment that are outlined.

GENERAL

A cursory glance at the outline reveals a new language or glossary to the uninitiated. The Apprenticeship and Trade Certification Board has stipulated that the areas outlined shall be taught within their relationship to the Carpenter trade and the depth of instruction and participation will be governed accordingly. Hours have been assigned to instruction. The hours stated are for guidance and not intended as a firm rule. Adjustments in time may be made for rate of apprentice acceptance, statutory holidays and Institute and Apprenticeship and Trade Certification examinations.

SAFETY EDUCATION

Safe working procedures and conditions, accident prevention and the preservation of health is of primary importance in the Apprenticeship programs in Alberta. These responsibilities are shared and require the joint efforts of the government, employers, employees and the general public. Therefore, it is imperative that all parties become aware of circumstances that may lead to injury or harm and that safe learning experiences and environment can be created by controlling the variables and behaviors that may contribute to or cause an accident and/or an injury.

It is generally recognized that a safe attitude contributes to an accident free environment. As a result a healthy safe attitude towards accidents will benefit an employee by helping to avoid injury, loss of time and loss of pay.

A tradesman is possibly exposed to more hazards than any other person in the work force and therefore, should be familiar with the Occupational Health and Safety Act and Regulations dealing with his own personal safety and the special safety rules applying to each job.

LEGAL AND ADMINISTRATIVE ASPECTS

Employer's Responsibilities:

Accident prevention and the provisions of safe working conditions are the responsibilities of an employer. The company is responsible for:

1. The provision and maintenance of safety equipment
2. The provision of protective devices and clothing (as required by the Occupational Health & Safety Act, General Safety Regulations)
3. The enforcement of safe working procedures
4. Adequate safeguards for machinery, equipment and tools
5. Observance of all accident prevention regulations
6. Adequate training to allow a worker to use or operate equipment in an effective and safe manner.

Government's Responsibilities:

Apprenticeship and Trade Certification in conjuction with the respective Provincial Apprenticeship Committee assumes the responsibility to assure that adequate safety is reflected in the curriculum and that adequate safety instruction is presented at the training establishments.

The Occupational Health and Safety Inspection Branch assumes the responsibility for periodic inspection of the operation to ensure that regulations for industry are being correctly observed.

Individual's Responsibilities:

The employee is responsible for:

1. Knowing and working in accordance with the safety regulations pertaining to job environment and
2. Working in such a way as not to endanger himself or his fellow employees

The major factor in safety is the individual employee, his personal attitude toward safety and having an awareness of the respective safety regulation.

CARPENTER PROGRAM

SUBJECTS	TIME DISTRIBUTION IN HOURS				
	1st PERIOD	2nd PERIOD	3rd PERIOD	4th PERIOD	TOTALS
Materials and Fasteners	12	4	4	4	24
Handtools	40	9	6	6	61
Machines and Power Hand Tools	33	18	15	16	82
O.H.& S. Regulations (Safety, Code)	13	5	5	5	28
Metal Partitions		12		4	16
Building Operations (Layout)	21		16	2	39
Forming	26		30	2	58
Framing	16	26			42
Explosive Actuated Tools	6				6
Blueprints	32	32	32	56	152
Trade Mathematics	32	32	32	24	120
Roof Framing		28	33	6	67
Roof Coverings		4			4
Insulation Air/Vapour Barriers		3			3
Doors		15			15
Windows		2			2
Interior Finish		12	9	35	56
Exterior Finish		12		8	20
Stairs		20	18	18	56
Transit and Builder's Level	2		10		12
Concrete	1		12		13
Reinforced Concrete Construction			9		9
Timber Construction			4		4
Renovations and Building Additions				6	6
Energy Efficient Construction	1	1		18	20
Practical Examination				22	22
Administration & Division Examinations	5	5	5	8	23

CARPENTER PROGRAM

Subjects and Time Distribution

First Period	**8 Weeks**	**30 Hours Per Week**	**240 Hours**
Section One:	Theory		56
Section Two:	Shop		120
Section Three:	Blueprints		32
Section Four:	Trade Mathematics		32

Second Period	**8 Weeks**	**30 Hours Per Week**	**240 Hours**
Section One:	Theory		56
Section Two:	Shop		120
Section Three:	Blueprints		32
Section Four:	Trade Mathematics		32

Third Period	**8 Weeks**	**30 Hours Per Week**	**240 Hours**
Section One:	Theory		56
Section Two:	Shop		120
Section Three:	Blueprints		32
Section Four:	Trade Mathematics		32

Fourth Period	**8 Weeks**	**30 Hours Per Week**	**240 Hours**
Section One:	Theory		48
Section Two:	Shop		112
Section Three:	Blueprints		56
Section Four:	Trade Mathematics		24

FIRST PERIOD TECHNICAL TRAINING

SECTION ONE: **THEORY** **56 Hours**

TOPIC	COURSE OBJECTIVES
	Upon successful completion of each section the apprentice should be able to:
A. Program Introduction	**3 Hours**
1. The Construction Industry	1. Identify the roles of Federal, Provincial and Municipal authorities and the legal implications of the industry. 2. Describe the scope of the Carpenter trade in light, commercial and industrial construction.
B. Materials of Construction	**8 Hours**
1. Solid woods	1. Recognize and classify decidous and coniferous woods common to the carpenter trade and know the commercial uses for them. 2. Identify physical properties and grains of wood; describe the aesthetic qualities of wood. 3. Name the range of wood grades. (a) framing lumber (b) common hardwoods 4. Describe and identify the flaws relating to growth or milling. 5. Explain the relationship between moisture content of wood and shrinkage. 6. List the flaws and defects relating to improper storage.
2. Other Wood Materials	1. Identify the methods of manufacture and classifications for plywood, chipboards, particle boards, composition boards. 2. State the range of dimensions and the typical usage for these materials. 3. Describe the proper storage and handling. 4. List the prefinished types with vinyl or melamine overlays. 5. Identify the surface veneers of commonly used plywoods, standard thickness and cores.
3. Wood Mouldings and Joints	1. Recognize the standard moulding shapes and range of sizes. 2. Identify the common usages. 3. List the typical joints for installation, butt, mitre, cope. 4. Recognize and understand the common uses of joints for fabrication: butts, rabbet, mitre, middle, end and crosslap, dado, groove and spline, tongue and groove, scarf, finger, dovetail and mortise and tenon.
4. Other Common Materials	1. Identify usage in industry of metal products (flashing, studs, channels, trims); Portland cements and aggregates; plastics (membranes, laminates and solids); below-grade insulation.
5. Fasteners	1. Recognize and list the general purpose fasteners; gauges and lengths available for nails, screws, bolts and staples; identify the available coatings and where to use them. 2. Identify types, usages, shelf life and the curing periods for adhesives.
C. Handtools	**3 Hours**
1. Small Tools	1. Recognize the typical tools used in the Carpenter trade and the correct application for each: (a) measurement, layout and alignment tools (b) squaring, marking tools (c) cutting tools; edge and tooth

TOPIC	COURSE OBJECTIVES
	(d) boring, drilling tools (e) securing, assembly tools (f) prying, dismantling tools (g) sharpening tools: vises, clamps, saw sets, stones, files, lubricants (h) sandpapers and abrasives
2. Typical Tool Kit	1. Prepare a list of tools required for forming, framing and finishing jobs.
D. Machines and Powered Hand Tools	**3 Hours**
1. Woodworking Machines and Powered Handtools	1. Identify and describe the safe operation, application and regular maintenance for the following list of equipment: (a) table saw (b) radial arm saw (c) portable electric saw (d) chain saw (e) jointer (f) planer (g) band saws (h) grinders (i) sanders (j) cut-off saws (k) light and heavy duty drills (l) pneumatic nailing equipment (m) wood and abrasive cutting blades
2. Pneumatic Nailing Equipment	1. Identify the major components of a pneumatic nailer, stapler and regular maintenance requirements. 2. Describe the range of job applications. 3. List the available accessories and simple jigs.
E. Occupational Health and Safety Regulations	**4 Hours**
1. Study of the Applicable Regulations	1. Identify the Safety Regulations as they apply to the safe work practices in carpentry and related trades with emphasis on: (a) general safety precautions (b) housekeeping, personal protective equipment, clothing (c) guards (d) grinding (e) rigging (f) woodworking saws, hand fed, cross and rip saws (g) anti kickback devices (h) portable hand operated saws (i) hand fed planers and jointers
2. Construction Safety Regulations	1. Describe safety regulations with emphasis on: (a) use of safeguards (b) ladders (c) protection from falling materials (d) safety belts, lifelines, safety nets (e) scaffolds, half horse, bracket, pole, rolling, power lift (f) floor and roof openings, perimeter guardrails (g) temporary floors, temporary supporting structures (h) excavations, trenching (i) chain saws
3. Fire Prevention and Controls	1. Identify the types of fire extinguishers available and where used. 2. Define hazardous areas in construction. 3. Describe how to prevent fires.
4. Other Concerns	1. Outline emergency procedures — and how to obtain assistance for injured workmen.

TOPIC	COURSE OBJECTIVES
	2. Know the procedures for obtaining first aid training and certification. 3. Describe potential industrial health hazards for; (a) fumes and skin contact with toxic substance (b) noise (c) vibrating tools
F. Machines and Equipment	**3 Hours**
1. Light and Heavy Construction Equipment	1. Identify types and capacities available for handling workloads (a) excavating, trenching, compacting, backfilling (b) levelling, grading (c) concrete placement and consolidation (d) hoisting and lifting — tower and mobile cranes 2. Identify proper use of: (a) ropes, chains, slings, cables (b) shackles, hooks, knots (c) signal system
G. Building Operations	**10 Hours**
1. Elementary Introductions	1. List reasons for legal surveys, bylaws, permits. 2. Interpret site and plot plans. 3. Identify the location and elevation of utilities. 4. Describe soil testing in relation to bearing capacities, water tables and frost levels. 5. Describe how to excavate (soil removal and storage) (a) angle of repose and retaining systems 6. Describe how to set up the site to accommodate material flow. 7. Identify power (electricity) sources. 110V, 220V and 3 phase
2. Site Layout	1. Correctly use building lines and batterboards. Describe how to square buildings using 3-4-5 method and diagonal method. Explain the use of bench marks. 2. Define excavation lines. Describe the methods for establishing approximate levels for excavation. Describe the depth of cut and how to remove and store soils. (bulking)
3. Leveling Systems	1. Describe methods of establishing elevations with: (a) builder's level (b) spirit level and straight edge (c) hydro level (d) laser level
4. Theory of Structural Load	1. Identify natural and built-in forces on buildings. 2. Define vertical live and dead loads (wind, snow, mass, gravity, etc.). Describe the typical members in compressions — footings, walls, columns etc. State the importance of plumb and the alignment of loads with supporting members to avoid deflections, tensions, etc. 3. Describe what lateral forces act on partitions, floors, roofs, pilasters, buttresses, etc. 4. Describe the importance of proper connections, designs, etc. to counter known and anticipated forces.
H. Forming	**16 Hours**
1. Footings	1. Describe how to transfer building lines to the bottom of the excavation. 2. Describe the layout and design of footings for wall and bearing partitions (including stepped types) (a) setting stakes

TOPIC	COURSE OBJECTIVES
	(b) levelling, squaring, alignment procedures (c) spanning disturbed soil (trenches) (d) considerations for fill under slab (e) considerations for lateral pressures (concrete) (f) placement of keyways (g) consideration for placements of reinforcement (horizontal and vertical steel, anchor bolts, use of templates)
	3. Describe the layout procedure and design of footings for columns and posts. Identify the material and hardware used. Describe the stepped box types. Describe the use of templates and anchor bolts.
	4. Describe piles; list the purposes and types for light construction. (a) consideration for frost heaving
	5. Describe simple slabs used for basement floors, surface (grade) slabs, sidewalks and driveways. (a) identify typical thickness (b) describe control joints, isolation joints and curing time
	6. Identify slabs combined with piles for grade beams and slab stiffeners.
	7. Correctly interpret building regulations.
2. Wall Forms	1. List the forming materials used for concrete.
	2. Identify the types of ties, and forming accessories.
	3. List and identify the release agents and coatings used for forms.
	4. Describe built-in place systems and the importance of: (a) consideration for lateral (hydrostatic) pressures (b) spacing of supports (c) corner construction bracing (d) walers and strongbacks (e) hardware, ties, wedges, rod spreaders (f) installation of bucks, bulkheads (g) beam pockets and provisions for bearing (h) pilasters (i) alignment, square and level checks (j) stripping procedures
	5. Describe prefabricated systems. (a) types and panel sizes (b) assembly jigs (c) protective coatings and release agents (d) hardware — wood or metal walers (e) erection, alignment, bracing (f) stripping procedure
	6. Describe preserved wood foundations and proper use of this system using the required: (a) types of footings (b) stud size and spacing (c) sheathing materials (d) preservatives, sealants (e) alignment procedures (f) drainage
	7. Describe considerations to take into account before backfilling — lateral pressures, bracing, moisture proofing, drainage systems.
	8. Identify other systems: (a) unit masonry (b) precast

TOPIC	COURSE OBJECTIVES
I. The Floor Frame	**6 Hours**
1. Procedures for a Typical Residential Unit	1. Describe how to anchor to foundations with cast-in-place systems and sills and anchor bolts. 2. Illustrate setting steel beams and methods of attaching wood members. 3. Describe built-up beams in typical construction — relating joints to posts or supports. 4. Describe posts for beam supports. List the types of footings required. Describe crowns and the camber of beams. 5. Explain how to construct bearing partitions and typical layouts. (a) protection for wood on concrete below grade 6. Describe how to set floor joists. Define dimensions — spacing and spans. Discuss the typical layouts with emphasis on accommodating: (a) load bearings and non-load bearing partitions and walls (b) stacks, bathroom fixtures (c) chimneys, fireplaces (d) stair openings 7. Describe the use of special connectors and supports (hangers, ledgers) 8. Describe procedures to correct shallows or crowns that can occur after subfloor is applied. 9. Describe a truss joist — types and layouts. 10. Identify location of insulation and air/vapour barriers at joist line. 11. Identify bridging and purpose — the types, layout and installation procedures. 12. Describe subflooring. List and describe the types and their application: (a) spacing of fasteners and types (b) causes of squeaking floors (c) procedures for wood on concrete 13. Correctly interpret building regulations.

TOPIC	COURSE OBJECTIVES
SECTION TWO: **SHOP**	**120 Hours**
A. Hand Tool Operations	**32 Hours**
1. Skill Development	1. Competently use hand tools of all types in projects using wood materials. (a) solid woods, plywoods, chip and particle boards (b) practice with making and fitting joints of wood (c) practice with fitting of mouldings (d) gluing, clamping and lay-up 2. Sharpen and maintain hand tools.
B. Woodworking Machines and Powered Hand Tools	**30 Hours**
1. Safe Use of Machine	1. Set-up and operate prcedures with power tools and accessories listed in theory.
2. Practical Work	1. Demonstrate proficiency by making selected shop projects that make use of a variety of building materials.
C. Rigging	**6 Hours**
1. Slings and Hitches	1. Demonstrate slings and hitches used for preparing and lifting material. 2. Tie knots and hitches and be aware of load limits. 3. Demonstrate proper use and location of chokers and slings on loads for lifting. 4. Use signals to operators of lifting equipment. 5. Identify safe working loads (S.W.L.).
D. Explosive Actuated Tools Course	**6 Hours**
1. Objectives	1. Course will provide instruction in (a) safety (b) uses and applications (c) care, maintenance and operation (d) practical experience in firing
2. Theory	1. Describe and define high velocity and low velocity tools and their operation. Be aware of the safety features and the different types of fasteners and charges. Learn the safety codes and regulations. State causes of misfire. 2. Identify the operator's responsibility. Demonstrate safe operation. Explain the relationships between pins, charges and materials. Discuss the hidden features of fastening surfaces.
3. Practical	1. Demonstrate servicing and safe storage of tools and supplies. Demonstrate minimum service of all common tools. Learn proper and safe storage of tools and charges and the disposal of misfired charges. 2. Demonstrate operation and the actual firing of a high velocity and a low velocity tool. 3. Operate — take part in both the prefiring routine and fire both high velocity and low velocity explosive actuated type.
4. Test	1. Prove Proficiency upon successful completion of test and course.
E. Layout and Elementary Form Work	**36 Hours**
1. Establish Excavation Line and Building Perimenters	1. Establish excavation lines and building perimeters from given reference points. 2. Construct and brace batter boards. 3. Square with diagonal and 3-4-5 methods.

TOPIC	COURSE OBJECTIVES
2. Footing Forms	1. Transfer building lines to bottom of excavation. 2. Construct footing forms: (a) rectangular, "T" or "L" shape perimeters (b) squaring , levelling, alignment, bracing (c) keyways
3. Forms for Columns, Posts and Bearing Partitions	1. Construct footing forms for columns, posts and bearing partitions (also stepped types)
4. Layout and Erection of Wall Forms	1. Construct a built-in place wall form, as would be done on a job-site. 2. Use prefabricated panels for wall forms; use the various types of hardware and ties. Form pilasters and beam pocket. 3. Fabricate and install: (a) bucks (b) bulkheads (c) window units (d) reinforcements 4. Establish elevations and wall heights. Level joist system with: (a) ledgers, shims for cast in place joist systems (b) provision for sills on concrete and use of anchor bolts.
5. Concrete Slabs	1. Layout, setting forms, pegs and screeds for concrete slabs on or below grades. (basement floors, grade slabs, sidewalks). Use elevations, slopes and control joints. 2. Form round or circular slabs with various radii.
F. Floor Framing	**10 Hours**
1. Joist Layouts on Bearing Partitions and Beams	1. Layout joists for considerations for loads — other trades, including bearing and nonbearing partitions, floor openings, plumbing stacks and fixtures and fireplaces. 2. Set floor joists using these techniques and materials: (a) checking alignment — crown of joists (b) bridging systems (c) application systems (fasteners and adhesives) used for common boards, T & G, plywood.

TOPIC	COURSE OBJECTIVES	
SECTION THREE:	**BLUEPRINTS**	**32 Hours**
A. Introduction of Drawings and Instruments	1. Identify object, extension, center, hidden and break lines. 2. Practice using drawing instruments for lines and numbers.	**6 Hours**
B. Freehand Sketching	1. Produce a sketch using trade symbols. 2. Use basic drawings as an aid in understanding glossaries.	**4 Hours**
C. Drawing Specifications	1. Develop basic orthographic and isometric presentations. 2. Draw plan and elevation views for shop projects.	**16 Hours**
D. Blueprint Interpretation	1. Interpret residential and light commercial blueprints to interpret: (a) site, plot (b) plan, elevation and section views (c) room finish schedules 2. Isolate items for other trades; correlate job assignments (a) Bricklayers — footings, bucks frames, etc. (b) Electricians, Plumbers and Sheet Metals — sleeves, access openings, etc. 3. Solve problems arising from study of blueprint. (discrepancy between different views)	**6 Hours**

TOPIC	COURSE OBJECTIVES
SECTION FOUR:	**TRADE MATHEMATICS** **32 Hours**
A. Calculations Related to Trade Practices	
1. Basic Operations	1. Demonstrate competence in basic mathematics using whole numbers, fractions, decimals and percentage.
2. Basic Units and S.I.	1. Use basic S.I. system as used in trade.
3. Linear Measurements	1. Calculate measurements of square, rectangular, circular shapes and irregular (geometric) shapes.
4. Area	1. Solve area problems of square, rectangular, circular shapes and irregular (geometric) shapes.
5. Volumes	1. Calculate the volume (capacities) of compartments, bins, excavations, forms.
6. Proportions	1. Calculate percentages and proportions.
7. Material Quantities	1. Calculate quantities related to study of plans and drawings: (a) general — scaffolding, equipment use and repair (b) milling, spoilage and waste allowances (c) cutting list for specified projects (d) fasteners required for area (e) quantities for excavation, forming, concrete, fill and floor framing as they relate to theory and blueprint reading sections

SECOND PERIOD TECHNICAL TRAINING

SECTION ONE: **THEORY** **56 Hours**

TOPIC	COURSE OBJECTIVES
	Upon successful completion of each section the apprentice should be able to:
A. Framed Structures	**9 Hours**
1. Design	1. Identify framing systems and how they differ with respect to load transfer and shrinkage. 2. Explain the importance of specifications and details.
2. Applicable Codes	1. Read codes and span tables.
3. Comparison of Framing Systems	1. Describe the following framing systems: (a) western platform (b) balloon (c) post and beam (d) plank wall (e) rigid frame
4. Walls and Wall Partitions	1. Describe plate layout for exterior walls: (a) relating to door and window dimensions (b) room heights, length of studs and spacing (c) corner construction and intersecting partitions (d) wall openings (e) energy efficient construction 2. Describe the assembling and erecting of walls: (a) squaring and aligning for sheathing (b) exterior finish considerations (backing for vertical siding and interior fixtures) (c) sheathing application (d) erecting and temporary bracing procedures (e) considerations for multistorey buildings 3. Describe the layout and erection of interior partitions. Explain the necessary considerations for: (a) typical and special doors and door units (passage, pocket, bypassing, bifold and folding) (b) laundry chutes, chimneys, girths, fire stops, sound transmissions (c) other trades (fireplaces, bathroom fixtures, heating systems, backing for finish materials and units) (d) erecting, aligning and bracing procedures (e) vapour barriers behind and on top of partitions 4. Correctly interpret building regulations.
5. Energy Efficient Construction	1. Describe the basic construction techniques used.
B. Other Walls and Partitions	**4 Hours**
1. Metal Stud Partitions	1. Describe bearing and nonbearing systems with emphasis on: (a) floor and ceiling runners (b) securing systems to various materials (c) corner and intersecting walls (d) framing for door and other access openings (e) internal, lateral bracing procedures (f) accessories (corner beads, wall angles, clips, bars) (g) fire rating
2. Horizontal and Vertical Application of Gypsum Boards	1. Identify types of gypsum boards and patterns for joints. 2. Select and locate screws. 3. Discuss laminated systems (backing boards and strip systems).

TOPIC	COURSE OBJECTIVES
3. Setting Metal Frames	1. Describe levelling, plumbing and securing procedures.
4. Prefabricated Partitioning Systems	1. Explain the applications. 2. Describe the types and finishes available, the components and erection systems and the installation of doors, glass units, etc.
5. Suspended Ceiling Systems	1. Describe layout and installation procedures.
C. Ceiling Joists	**2 Hours**
1. Layout for Gable and Hip Roof Systems	1. Describe the dimensions, spacings, spans using building codes. 2. Explain butting or lapping of joists. 3. Show how to incorporate joists for flush or dropped beams. 4. Define the considerations for roof slopes with wood over plates and stub types for hip roofs. 5. Explain purpose of strongbacks and ribbons. 6. Describe supporting and backing for parallel partitions. 7. Describe framing requirements for access openings.
D. Roof Framing	**14 Hours**
1. Roof Framing Systems	1. Identify the following framed roof systems: (a) flat (b) shed (c) gable (d) hip (e) hip and valley
2. Roof Design	1. Explain the following roof design terms: (a) rise (b) run (c) overhang (d) span (e) ridge boards (f) lookouts (g) barge boards (h) cornices (i) projection
3. Gable Roof	1. Calculate: (a) line lengths and shortenings (b) plumb and level cuts (bird-mouths, tails) (c) collar ties — barge boards 2. Explain the cutting and erection procedures with and without ridge boards. 3. Identify gable ends: (a) built-in place (b) prefabricated and raised in place (vents, louvres) (c) other considerations (eg. backing for interior finishes) 4. Describe the use of sheathing and exterior finish. 5. Discuss the consideration at wall line for insulation and air/vapour barriers.
4. Cornice Details (Wood, Metal, Vinyl)	1. Recognize flush systems (without soffits). 2. Describe boxed eaves: (a) soffits (b) fascia (c) frieze boards (d) barge boards

TOPIC	COURSE OBJECTIVES
	3. Explain built-in place and prefabricated systems with emphasis on: (a) auxiliary venting (b) cornice returns
5. Light Trusses	1. Identify typical trusses used in "light" construction: (a) Fink (W), Howe or Kingpost truss (b) spans and spacing, members intension and compression (c) gusset and nailing patterns
	2. Describe the fabrication and erection procedures for other roof units with emphasis on: (a) combining trusses with built-in place rafters (b) fabrication and erection of rigid frame members (c) fabrication and erection of arch ribs
	3. Describe the use of sheathing: (a) grades and types — joint patterns (b) fasteners — types and spacing (c) considerations for eavestroughing
	4. Explain the considerations for roof openings.
E. Shingles — Roofing	**3 Hours**
1. Materials and Systems	1. Identify the following: (a) built up roofing (b) rolled roofing (c) cedar shingles and shakes (d) asphalt (regular, low slope) (e) tile and slate (f) metal (g) hardboard (h) fiberglass
	2. Identify application procedures of above: (a) papers, felts, rigid insulations (starter shingles, exposures to weather, flashing systems and fasteners)
F. Insulations, Building Papers, Air/Vapour Barriers	**4 Hours**
1. Insulations	1. Recognize insulations and the typical usage in industry: (a) blanket — batt (b) rigid (c) loose-fill (d) foamed-in-place (e) reflective
	2. Describe placement techniques.
	3. List the thickness and R.S.I. values.
2. Heat Transfer and Loss	1. Explain the theory of heat transfer and loss.
3. Vapour Barriers	1. Identify types, thickness and explain the purpose of vapour barriers with emphasis on: (a) moisture content and levels in building and materials (b) problems relating to moisture penetrations (installation, application procedures, repair of punctures)
4. Air Barriers	1. Identify types of paper, felts and others used industry (weights, laps, etc.)
G. Wood and Metal Doors	**4 Hours**
1. Door Types	1. Recognize door types, ranges of sizes and common uses with emphasis on: (a) solid and hollow cores (b) panelled (c) other glazed units, fire rated, overhead, sliding patio, custom designed architectural

TOPIC	COURSE OBJECTIVES
	(d) insulated doors
2. Exterior and Interior Door Frames	1. Identify the differences between rabbetted jambs and unrabbetted jambs. 2. Describe how to layout, cut and assemble jambs and sill for exterior doors. 3. Describe the fabrication and installation of frames for: (a) swing of door, clearance (b) weather seals, flashing (c) trims, casings, thresholds, astragals 4. Describe the installation of frames used for special units (overhead, pocket and folding doors).
3. Hardware for Doors	1. Describe the hinges available. 2. Describe hangers and rollers (grips, recesses, edge pulls). 3. Differentiate between lockset and latch, identify magnetic hold openers, fused link and lock systems. 4. Recognize closers, bars and push plates. 5. Describe special security items including bolts, bars, dead locks. 6. Identify panic hardware as specified in code.
4. Door Hanging and Hardware Installation	1. Explain the use of door bucks (Jacks) to plane doors. 2. Explain the use of simple templates and jigs for hardware installation. 3. Describe how to cope with moderate crowns or bows. 4. Describe how to adjust previously hung doors because of the settling of buildings and moisture absorption. 5. Describe the installation of prehung door units. 6. Identify standard locations for different hardware installation.
H. Windows	**2 Hours**
1. Typical Wood, Vinyl, Plastic and Metal Types	1. Recognize the following window types: (a) check rail (b) sliding (c) casement (d) awning (e) sealed units (f) skylights (g) bow (h) bay (i) hopper (j) pivot 2. Identify window accessories. 3. Identify special architectural units (T-bars, mullions, etc). 4. Relate requirements of glass to floor areas. 5. Discuss installation procedures for glass into openings and window units.
I. Exterior Finish	**4 Hours**
1. Exterior Finishes for Residential and Light Commercial Construction	1. Identify the following exterior finishes. (a) wood, shakes/shingles, V-joint, panels (b) treatments and coatings for plywood and siding (c) vinyl siding (d) metal siding (e) panel siding (f) masonry

TOPIC	COURSE OBJECTIVES
2. Application Procedures	1. Describe the purpose of: (a) building paper — felts (b) starting strips (c) corner boards (d) battens 2. Describe installation procedures with emphasis on internal and external corners, use of storey pole flashing and sealants. 3. Explain how to use feature panels, provisions for expansion, battens, sealants.
3. Other Exterior Finishes	1. Discuss how stucco is applied. 2. Describe the use of brick veneer and review the role of carpenter with emphasis on footings, ledgers, drip caps, dividers, frieze boards.
J. Introduction to Wood Stairs	**10 Hours**
1. Basic Wood Stairs	1. Identify straight flight stair types and landings for: (a) cut out (notched) stringers (b) mitred stringers (c) semihoused stringer 2. Relate the following to codes: (a) rise and run (b) effective depth of stringers (c) nosing projections (d) distance between landings (e) handrails (f) headroom (g) width (h) doors
2. Layout, Cutting, Assembling and Installation Procedures	1. Identify materials for stairs and landings. 2. Describe methods of support for hanging of landings. 3. Describe the use of framing square applications for: (a) unit rise and run (b) plumb and level cuts 4. Describe methods of securing stringers or units to landings (attachment). 5. Describe surface treatments and coverings. List when to use nonslip surfaces and nosings. 6. Describe the installation and alignment of stairs and the securing of handrails.
3. Framing Requirements	1. Describe how to achieve stairwell openings. 2. Describe how to provide greater headroom clearances.

TOPIC	COURSE OBJECTIVES
SECTION TWO:	**SHOP** — **120 Hours**
A. Hand and Powered Tools	**6 Hours**
1. Hand Tools	1. Competently use hand tools as listed in first period. 2. Recondition hand tools: (a) hand saws (b) chisels (c) plain irons (d) drill bits
2. Powered Tools	1. Competently operate electric hand plane, router, screw gun and any other necessary powered tools Emphasis must be on safe-use and application of tools. 2. Sharpen "Touch-up": (a) sawblades (b) drill bits
B. Wall Framing	**18 Hours**
1. Framed Wall and Partition Layouts	1. Layout plates and various spacing of members, including: (a) corners, intersecting walls (b) door and window openings (c) considerations for special items, frames for pocket doors and bifolds, fireplaces, insulation (d) backing requirements for fixtures 2. Assemble and sheath a wall. Erect and align the walls and partitions. 3. Layout and install ceiling joists. (a) butt or lapped joints (b) ribbons, strongbacks (c) integrating parallel partitions (d) backing for finish materials (e) location and framing requirements for attic access
C. Roof Framing	**20 Hours**
1. Gable Roofs — Demonstration and Practice	1. Use framing square for layout of: (a) pattern common rafter (b) barge board-line lengths, plumb and level cuts (c) shortenings 2. Layout collar ties.
2. Light Trusses — Demonstration and Practice	1. Layout Fink, Howe and scissor trusses, and reason for high heel trusses. 2. Demonstrate typical erection procedures.
3. Gable Ends — Demonstration and Practice	1. Erect built-in-place gable ends for standard and drop gables. 2. Prefabricate and raise in place gable ends. Use nailing strips and backing properly.
4. Cornices — Demonstration and Practice	1. Build and install soffits and fascias: (a) built-in-place (b) prefabricated and secured in place (c) auxiliary vents 2. Build boxed eaves. 3. Layout, cut and install barge boards.
5. Simple Shed Roof — Demonstrate and Practice	1. Construct a simple shed roof. 2. Layout of roof joist for flat roof.
6. Roof Coverings	1. Install wood and asphalt shingles.

TOPIC	COURSE OBJECTIVES
D. Doors	**15 Hours**
1. Exterior Door Frame with Sill, Demonstrate and Practice	1. Fabricate exterior door frames with sill.
2. Installation	1. Install a door jamb into a prepared opening (building paper).
3. Hanging Doors	1. Hang a door correctly. 2. Install a lock (latch) set.
4. Other Frames and Doors	1. Install other frames and doors eg. pocket, bifold and overhead doors.
E. Wood Stairs	**15 Hours**
1. Stair Stringers in a Straight Flight	1. Layout stair stringers, notched, mitred, semi-housed. 2. Use templates and jigs.
2. Stair Units	1. Cut and assemble stair units.
F. Exterior Finish	**12 Hours**
1. Wood, Metal and Vinyl Sidings	1. Practice vertical and horizontal applications of siding. (a) paper, starting strips, drip caps (b) installation around window and door units (c) flashing and sealants
G. Metal Partitions	**10 Hours**
1. Nonbearing Partitions	1. Install a typical nonbearing partition of metal tracks and studs with emphasis on: (a) internal bracing (b) access openings (c) installation of frames
2. Gypsum Wall Boards	1. Apply procedures for gypsum wall boards.
3. Suspended Ceiling Systems	1. Layout and install a suspended ceiling system.
H. Skill Development	**24 Hours**
1. Selected Projects	1. Develop and reinforce skills with hand and power tools. 2. Correctly use fittings, scribing, coping. 3. Develop geometric units. 4. Install units with sliding, adjustable components. (a) doors, drawers

TOPIC	COURSE OBJECTIVES
SECTION THREE: BLUEPRINTS	**32 Hours**
A. Residential and Light Commercial Blueprints	**20 Hours**
1. Checking Plans with Specifications	1. Relate specifications to plans, elevation and section view.
2. Reference Points	1. Read plans to establish reference points for building lines, elevations, etc.
3. Architectural Units	1. Describe special exterior features: (a) gable, hip and valley, gambrel, mansard roofs (b) dormers (c) flat roof framing (d) window bays, cantilevered units (e) various exterior treatments — brick veneer, stucco and siding combinations, panels, battens (f) entrance (step) treatments (g) landscaping — retaining walls, window wells
4. Interior Finish	1. Identify backing for future installations. 2. Identify access openings for ducts, chutes, chimneys.
5. Problem Solving	1. Calculate assigned problems arising from study of blueprints.
B. Drawings	**12 Hours**
1. Formal Drawings and Freehand Sketching	1. Detail and clarify vague or obscure items in plan and section views — use specialized terminology. 2. Develop working drawings for specified shop projects.

TOPIC	COURSE OBJECTIVES
SECTION FOUR:	**TRADE METHEMATICS** **32 Hours**
1. Review First Period	1. Use skills developed in first period.
2. Walls and Partitions	1. Calculate quantities related to plans and specifications. 2. Calculate door and window openings.
3. Ratio and Proportion	1. Calculate similar triangles. 2. Calculate rim and cutting speeds. 3. Calculate slopes.
4. Roof Framing	1. Make calculations relating to common rafters and light trusses: (a) line lengths (b) gable ends (c) quantities — sheathing, shingles, cornice framing
5. Stairs	1. Calculate rise and run and calculations to obtain head room. 2. Calculate quantities for specified stairs.
6. Exterior Finish	1. Calculate weather exposures of siding to type and height of walls. 2. Calculate quantities from study of elevation views and plans.
7. Specified Projects	1. Calculate cutting lists for specified projects.
8. Mechanical Advantages	1. Calculate use of levers and pulleys.

THIRD PERIOD TECHNICAL TRAINING

SECTION ONE: **THEORY** **56 Hours**

TOPIC	COURSE OBJECTIVES
	Upon successful completion of each section the apprentice should be able to:
A. Transit and Builders Level	**8 Hours**
1. Legal Description of Property	1. Define and locate sections, township, range and Meridian used in legal survey. 2. Define and locate plan, block and lot within a subdivision.
2. Scope and Applications of Survey Instruments	1. State the uses of a transit, parts, purposes, survey terminology and reading scales. 2. State the uses of a builder's level and when to use accessories (rod types, stick and tape measure, targets and chairs). 3. State the uses of laser equipment.
3. Site Applications	1. Describe topographical considerations on a large site: (a) foresights — backsights (b) establishing elevations, reading existing slopes (in degrees) (c) lines and stakes — perimeters
4. Building Layouts and Checks	1. Describe the transfer of elevations using established bench marks and working bench marks. 2. Describe how to locate centers and running lines for piles and footings. 3. Describe how to establish locations for items on the same plane: (a) top of foundations (b) floor lines, window lines, ceiling heights 4. Describe vertical checks: (a) checking existing adjacent buildings for plumb (b) vertical checks for wall forms, walls, architectural lines. 5. Describe how to establish grades and slopes (in degrees).
B. Concrete	**12 Hours**
1. Scope Within Industry	1. Describe architectural and structural concrete: (a) cast (poured)-in-place (b) precast 2. Identify fire ratings and acoustic values.
2. Composition of Cements and Typical Usage	1. List ingredients and use for normal portland cement. 2. List cement types. 3. List other additives and their purpose, advantages and disadvantages: (a) retarders (b) accelerators (c) air entrainment (d) coloring agents (e) plasticizers (f) hardeners (g) effects on compressive strength, durability and water tightness
3. Aggregates	1. Explain the types and gradation. 2. Identify the tests done in field and laboratory for: (a) moisture and bulking (b) organic content (c) fineness modulus 3. Describe special light weights aggregates. (a) structural (b) architectural

TOPIC	COURSE OBJECTIVES
	4. Explain the use of heavy aggregates.
4. Concrete Design	1. Identify the range of compressive strengths and the typical demands in industry.
	2. Explain batching by weight and by volume with emphasis on: (a) principles of hydration (b) paste to aggregate ratios (c) slump tests (d) design tables
5. Curing	1. Explain necessary considerations to cure in hot and cold weather. Relate industry practices.
	2. Describe the hydration process and how to retain moisture.
6. Grouts and Slurries	1. Describe where grouts and slurries are used.
	2. Identify paste to aggregates ratio.
	3. Identify bonding agents.
7. Topping Finishes	1. Describe where and how topping finishes are used and applied.
8. Concrete Placement	1. Describe concrete placement for forms and decks with reference to: (a) consolidation and integration of deposits (lifts) (b) forces — hydrostatic, uplifts (c) thermal expansion
	2. Explain the cause of segregation and the use of chutes, tremies and pumps.
9. Establishing Elevations	1. Describe how to establish reference points using: (a) screeds, pegs, and chairs (b) tolerances
10. Form Watching During Pours	1. Describe the precautions necessary.
	2. Identify critical areas.
11. Surface Finishing Systems	1. Identify the tools and equipment necessary and their functions.
	2. Identify where rough texture is desirable: (a) crawl spaces (b) base for other trades
	3. Describe how to make nonslip surfaces using: (a) brushed or rolled surfaces (b) inserts
12. Architectural Concrete Finish	1. Describe how to maintain accuracy of form work — joint patterns.
	2. Describe how to create special treatments to columns and walls: (a) formliners — inserts for effect (water treatment and sand blasting)
C. Safety Review	**3 Hours**
1. Comprehensive Review	1. Identify hazards and dangers encountered on large projects: (a) scaffolding systems (b) swing stages (c) site barricades (d) employer-employee responsibilities (e) excavations (f) working around heavy equipment (g) moving forms
	2. Identify dangers when hoisting or lifting equipment is used: (a) hooks, shackles, slings (b) accepted signal systems
	3. Identify hazards inherent with material skips.

TOPIC	COURSE OBJECTIVES
D. Reinforced Concrete Construction	**9 Hours**
1. Forces Encountered During Concrete Pours	1. Describe the forces encountered and transmitted during pouring of concrete and describe the necessary compensations through form design and supports: (a) compression (b) tension (c) lateral pressures (d) torque — racking, shearing, deflections, distortions (e) safety and responsibilities in form design
2. Joints	1. Describe the joints used to compensate for built-in and natural forces on structures: (a) construction joints (b) control joints (c) isolation joints (d) expansion joints-materials and installation systems in forms, sawn-in-place, fillers, sealants (e) joint pattern to create architectural features (f) water stops
3. Steel For Reinforced Concrete	1. Describe the guages, sizes and condition of welded mesh and bars. 2. Identify the accessories available — the types, purpose and installation procedures including: (a) tie wires, chairs, stirrups, reglets, sleeves. 3. Identify reinforcing schedules for footings, lintels, beams, columns, slabs, drop panels, walls with emphasis on: (a) positioning — concrete cover over steel (b) prefabricated reinforcing units and inserts (c) beam and column connections
4. Types of Form Systems — Layout and Alignment Procedures	1. Identify the typical slab on grade with reference to: (a) piles and grade beams (b) considerations for frost heaving — void forms (c) the use of moisture barriers 2. Identify slab stiffeners. 3. Describe methods for accommodating other trades: (a) heating ducts, sumps. 4. Describe how to locate and set anchors and plates. 5. Identify the considerations to be made prior to concrete placement: (a) removal of wood (organic) refuse, etc. (b) fill compaction-mesh placement joints
5. Special Design Footing and Wall Forms	1. Define battered footing forms. 2. Describe multisided forms. 3. Describe curved forms with reference to: (a) vertical segments and liners, kerf cuts for short radii (b) locating and setting anchor bolts 4. Describe stripping procedures. 5. Describe cleaning and storage procedures.
6. Columns-Type and Typical Locations	1. Describe structural and aesthetic columns: (a) light and heavy (built-on-site) (b) round, regular and irregular 2. Identify different form materials. 3. Identify and describe the use of typical hardware and accessories including: (a) clamps, yokes (b) banding

TOPIC	COURSE OBJECTIVES
	(c) collars, templates
	4. Identify design considerations for: (a) pressures during concrete placement (b) clean outs (c) chamfers
	5. Describe cutting and assembly procedures: (a) establishing column heights (b) alignment and bracing
	6. Describe prefabricated metal forms: (a) where used (b) maintenance (c) fasteners
7. Beam and Slab Construction	1. Identify shoring systems with reference to: (a) wood posts, adjustable metal types (b) mudsills, wedges, bracing
	2. Identify column materials and design for: (a) drop panels (b) flared capitols
	3. Describe typical beam and girder construction using spandrel beams.
	4. Identify slab decks with reference to: (a) span tables (b) ribbed and waffle systems (c) flat slabs — sleeves, sleepers, etc.
8. Stripping and Reshoring Procedures	1. Describe sequences of stripping and reshoring for beams and slabs.
	2. Describe the use of fly forms.
9. Special Project Systems	1. Describe slip forms.
	2. Describe large ganged sections.
	3. Identify cast on site tilt-up panels for: (a) steel placement — lift anchors (b) fabrication — lifting and bracing
10. Precast Concrete	1. Identify the types of precast concrete and where they are used: (a) pre-tensioned (b) post-tensioned
	2. Describe erection systems for precast units including: (a) hoisting equipment (b) bracing systems (c) connectors — sealants (curtain wall) (d) combining formed-in-place and precast units
E. Concrete Stairs	**4 Hours**
1. Formed Types	1. Describe cut-out stringers.
	2. Describe inverted stringers.
	3. Describe lay-out of forms on existing walls.
2. Typical Forming Procedures	1. Identify landings — keys and placement requirements of reinforcement.
	2. Describe risers and treads in reference to: (a) sloped risers (b) bracing systems (c) reinforcement (d) concrete placement and curing (e) finishing (f) stripping

TOPIC	COURSE OBJECTIVES
3. Precast Types	1. Describe lifting and anchoring systems.
4. Stair Finishes	1. Identify allowances for tread and landing surfaces. 2. Describe hand rail considerations and requirements.
F. Roof Systems	**10 Hours**
1. Framed Roofs	1. Identify gable and shed roof systems. 2. Identify other commonly used roof systems including: (a) regular hip (b) intersecting roofs of equal pitch 3. Identify materials used and describe layout procedures including: (a) ridge boards (b) common and end common rafters (c) hip rafters (d) jack rafters (e) valley rafters (f) hip-valley rafters (cripples) 4. Identify other considerations of roof systems for: (a) backing for interior materials — stub ceiling joists, etc. (b) combining trusses and built-in-place rafters (c) roof bracing procedures (d) soffits and fascias (e) sheathing and roof coverings (f) venting (g) large openings (skylight, chimneys)
2. Other Roof Systems	1. Describe the different techniques for constructing an intersecting roof of unequal slopes. 2. Describe gambrel and mansard roof construction. 3. Describe the sawtooth roof construction. 4. Discuss requirements for special features for: (a) sun porches (b) dormers (c) additions
3. Material and Components Used In Commercial and Industrial Construction	1. Identify what is necessary for the following roof types: (a) flat (b) domed and vaulted (c) folded plate 2. State the joist types and connections used for: (a) precast concrete (b) open web (wood and metal) (c) structural steel (d) decking procedures with various materials (precast concrete, wood fluted metal, manufactured fibre boards) 3. Describe roof finish systems including built-up. Refer to the preparation for other trades, cant strips and insulations.
G. Review of Carpenter's Role in the Preparation of Large Structures for Various Treatments or Finishes	**6 Hours**
1. Furring and Backing Systems	1. Identify the strapping methods for walls and ceilings — concrete and steel columns and beams. 2. Describe dropped ceilings for concealments of mechanical systems. 3. Explain the use of sleepers. 4. Describe plaster grounds.

TOPIC	COURSE OBJECTIVES
2. Finish Materials and Systems	1. Describe the uses of wood and wood substitutes; panels, solid and plastics laminated, glass. 2. Identify the uses of gypsum products — drywall and plastered. 3. Describe installation of accessories: (a) backing and furring, storage rooms, preparations for other trades.
3. Fastening Systems	1. Describe methods of securing wood components to concrete, masonry and metal. 2. Describe methods of securing metal components to wood, masonry and concrete. 3. Describe methods of securing insulation to all types of surfaces. 4. Describe securing cabinets and other fixtures to various walls and floors using mechanical fasteners and adhesives.
4. Frame Setting	1. Identify methods of setting of various frames and bucks for masonry and other walls.
5. Fire Ratings — Accoustics	1. Describe the function of designed control systems and the importance that tradesmen play with respect to adhering to design specifications: (a) decibels — sound transmission (b) heat transmission — flame spread 2. Describe the requirements of walls and ceilings that include: (a) noncombustible materials (b) cavities (c) baffles, etc. 3. Identify the loss of efficiency due to improper or careless work: (a) smoke through minute cracks, openings (b) sound through cracks, access openings
H. Timber Construction	**4 Hours**
1. Uses of Timber in the Construction Industry	1. Identify the uses of sawn timber in: (a) piling (b) heavy trusses (c) beams, joists, columns, bents, — preservatives, treatments, relating dimensions to spans, typical connectors.
2. Glue Laminated Units	1. Describe types, structural and aesthetic qualities. Relate dimensions to spans. Identify typical connectors.
3. Other Materials Combined with Timber or Gluelams	1. Describe the erection of walls on prepared footing. Describe lifting equipment, anchors, connectors, precautions against damage. 2. Describe open beam interiors with regards to: (a) box beams (b) exterior treatments — tails, open or boxed (c) roof decks — insulations 3. Describe application of wood decking: (a) joints and nailing patterns
4. Heavy Arch Ribs	1. Describe battered foundation walls. 2. Describe the lifting, anchoring systems.
5. Heavy Trusses	1. Describe the types and where they are used. 2. Identify the web arrangements with regards to: (a) panel points, connectors (b) purlins (c) knee braces, bents 3. Describe the lifting and bracing procedures.

TOPIC	COURSE OBJECTIVES	
SECTION TWO:	**SHOP**	**120 Hours**
A. Building Layout		**18 Hours**
1. Transit Builder's Level	1. Set up and operate builder's level and transit.	
	2. Site and record back sights and foresights.	
	3. Establish elevations.	
	4. Establish or re-establish a straight, off-set and grid lines.	
	5. Record existing angles.	
	6. Establish a given angle.	
2. Practice Layouts	1. Determine actual finish floor elevations from a given datum or bench mark.	
	2. Record back sights and foresights on a simple log sheet.	
	3. Transfer elevations using several set-ups.	
	4. Calculate, cut and fill requirements.	
	5. Locate building corners, property pins and excavation lines using the transit.	
	6. Locate footings, piles and other building components.	
3. Laser Equipment	1. Set up laser equipment.	
	2. Transfer elevations using laser equipment.	
	3. Transfer building lines using laser equipment.	
	4. State the potential safety hazards of laser exposure.	
B. Formwork		**33 Hours**
1. Forming Basic Columns	1. Erect formwork for columns using a variety of hardware and accessories.	
	2. Install chamfer strips.	
	3. Locate plumb, align and brace columns, and establish elevations.	
	4. Construct formwork for flared, haunched or multi-sided columns.	
2. Forming Slabs	1. Erect formwork for a flat slab.	
	2. Erect formwork for a ribbed slab.	
	3. Erect formwork for a pan slab.	
	4. Construct a simple fly form.	
	5. Level, align and brace slab forms.	
3. Forming Walls	1. Erect formwork for a wall using a variety of hardware and accessories.	
	2. Install bulkheads, door bucks, window bucks, sleeves and accessories.	
	3. Align and brace wall forms.	
	4. Construct a simple gang or giant form.	
C. Concrete Stairs		**15 Hours**
1. Stair Project	1. Develop a full size stair layout.	
	2. Construct the formwork to support a concrete stair and landing.	
	3. Cut and install inverted and open stringers.	
	4. Install sloped riser forms.	
	5. Install shoring to support the concrete stair and formwork.	
	6. Install bracing to resist lateral movement.	

TOPIC	COURSE OBJECTIVES
D. Roof Framing	**24 Hours**
1. Layout and Erection of Roofs with Hip and Valley Rafters with Equal Slopes	1. Layout rafters as mentioned in second period. 2. Erect selected roof types to include hip rafters, valley rafter, jack rafters and ridge boards. 3. Develop sheathing cuts for intersecting roofs.
E. Skill Development Projects	**30 Hours**
1. Construct Selected Projects that Develop the Skill Required for On-Site Finish Work	1. Match wood grains and apply edge veneers and plywood. 2. Work with a variety of joints and solid woods. 3. Use clamps and glues. 4. Use contact adhesives. 5. Construct and install drawers, doors and shelves and sliding components. 6. Use jigs, templates and other accessories to increase the efficiency of a variety of power tools. 7. Cut, fit and apply plastic laminates or other wood substitutes.
2. Development of geometric units	1. Develop obtuse, acute and compound angles and incorporate them into a project.

TOPIC	COURSE OBJECTIVES
SECTION THREE: BLUEPRINTS	**32 Hours**
A. Study of Blueprints for Buildings that are Substantially of Reinforced Conrete	**16 Hours**
1. Blueprints	1. State the purpose and list the information that would normally be found on: (a) Architectural drawings (b) Structural drawings (c) Mechanical drawings (d) Electrical drawings (e) Shop drawings
2. Specifications	1. State the purpose of a standard specification. 2. State the relationship of specifications to drawings. 3. Locate information in a standard specification.
3. Site Plans	1. Determine the dimensions, orientation and location of building services and fixtures. 2. Relate bench marks or datums to finish floor elevations. 3. Relate finished contours with that of existing contours.
4. Foundation Plans	1. List the information normally found on foundation plans. 2. Locate and determine size of footings, piles, grade beams and foundation walls.
5. Floor Plans	1. List the information normally found on the floor plan. 2. Locate and determine the size of rooms, doors, windows and other components from a floor plan.
6. Sections	1. State the purpose of section drawings. 2. Orient the section to the floor plan and elevations. 3. Determine the size, location and types of material used for construction from section.
7. Miscellaneous Details	1. State what information is usually clarified by the use of details. 2. Determine the relationship between the details and other drawings.
8. Elevations	1. Relate elevations to floor plans and details.
9. Schedules	1. State the advantage of and list types of information that could be found on schedules. 2. Use schedules to find information.
10. Interior Considerations	1. Determine size and location of cabinets, fixtures and built-ins. 2. Determine ceiling types, grid patterns, locations and heights. 3. Determine other material types and finishes.
B. Study of Blueprints for Building with Glued-Laminated or Timber Construction	**4 Hours**
1. Trusses	1. Identify truss types, spacing and connections used. 2. Determine bracing requirements specified. 3. Determine the spans and slope of trusses.
2. Glued-Laminated Beams, Ribs	1. Identify the components as to type and quality used. 2. Determine size and spans of members. 3. Determine the spacing, bracing and connectors used.

TOPIC	COURSE OBJECTIVES
C. Drawing Assignments	**12 Hours**
1. Obscure Items	1. Sketch freehand or with the aid of a straight edge items that require clarification. Suggested items — stepped footings, grade beams, timber and glued-laminated connections.
2. Shop Projects	1. Draw shop drawings and sections to be used to construct shop projects.
3. Drawing for Job Communications	1. Draw quick sketches freehand or with the aid of a straight edge that would be suitable for on job site information.

TOPIC	COURSE OBJECTIVES
SECTION FOUR:	**TRADE MATHEMATICS** **32 Hours**
A. Mathematics Relating to Blueprints Shop and Theory	
1. Concrete	1. Calculate volumes related to plans and specifications.
	2. Calculate batch design to various yields and strengths.
2. Building Layout	1. Make calculations related to instruments: (a) elevations, grades
	2. Make calculations for building lines from reference points. (a) volumes for earth removal, fill
3. Formwork	1. Make calculations for material quantities related to study of quantities related to study of plans and blueprints.
	2. Calculate spacing and layout of inserts.
4. Concrete Stairs	1. Calculate unit rise, run, headroom clearances and total run.
	2. Make calculations for forming material and concrete volumes.
5. Roof Framing	1. Calculate line lengths and material quantities for intersecting roofs.
6. Finish Work	1. Develop cutting lists and calculate material quantities for: (a) wall coverings, storage units, trim, doors, hardware
7. Introduction to Costing	1. Calculate labour factors.
	2. Calculate maximum usage in material break-out.

FOURTH PERIOD TECHNICAL TRAINING

SECTION ONE: **THEORY** **48 Hours**

TOPIC	COURSE OBJECTIVES
	Upon successful completion of each section the apprentice should be able to:
A. Exteriors and Interiors of Buildings	**16 Hours**
1. Typical Exterior Treatments for Commercial Buildings	1. Identify combinations of materials for exteriors on: (a) motels (b) apartment complexes (c) shopping centers
2. Procedure for Various Systems (Emphasize Carpenter's role)	1. Describe procedures for entrance doors, window treatments and fences. 2. Describe roof requirements for: (a) mansard concepts (b) parapet walls (c) sealants (d) flashings 3. Describe preparations for other trades: (a) furrings, ledgers, footings (b) arches
3. Interior Finish Materials — Handling and Storage Procedures	1. Describe the effects of humidity levels on various materials including pre-expansion (equilibrium moisture content, E.M.C.) for specified materials. 2. Determine the allocation of materials; distribution or storage on job site: (a) weight and point loading (b) accessibility of materials to expedite work schedules 3. Identify and isolate the causes of stain or discoloration to wood and other materials including: (a) poor housekeeping (b) mortars, gypsum droppings (c) sunlight, moisture (d) protective coverings 4. Describe and identify how flaws or adhesives are highlighted or obscured under various stains, flat or gloss finishes. 5. Describe how to repair minor defect prior to woodfinishing. 6. Describe how to repair minor defect on finished surfaces.
4. Installation Procedures for Interior Systems	1. Describe how to apply gypsum wall finishes with reference to: (a) selection and spacing of nails and screws and the causes of nail popping (b) laminated systems — strip and backing boards and adhesives (c) bending of gypsum sheets — moisture and Kerfed systems 2. Explain the procedures for installing plaster on gypsum and metal lath: (a) wood grounds (b) curing times 3. Describe the installation of ceiling tiles — acoustic and decorative types. 4. Describe the method of installation of demountable partitions with panels of various textures and finishes. 5. Describe the method of installation of suspended ceilings: (a) concealed, semiconcealed and exposed T systems (b) levelling, carrying and bracing systems (c) grid layouts for regular and irregular areas (d) provisions for dropped or stepped ceilings

TOPIC	COURSE OBJECTIVES
5. Wood Panels	1. Describe how to select wood panels for grain and color. 2. Describe layout methods for: (a) minimizing or accentuating mouldings (b) making provisions for electric outlets and other openings (c) using nail or screw-on systems (d) correctly choosing adhesives (e) describing the use of valances
6. Other Wood Finishes for Walls, Ceilings and Floors	1. Describe the use of vertical and horizontal strips, frame and panels, etc. 2. Describe how to apply strip and parquet flooring.
7. Trim Components and Systems for Various Finishes	1. Describe the procedures for applying trim components and systems for various finishes on wood, metal and plastic and the making of external and internal corners.
8. Storage Room and Components	1. Describe the procedures for building of shelves with emphasis on the use of: (a) spacing, spans, supports (b) racks, bars, etc.
9. Installation of Prefabricated Door Units, Walls, Cabinets	1. Describe the installation procedures relating to specifications with reference to: 2. Describe installation procedures for cabinets. Refer to: (a) straightening — furring of crooked walls (b) scribing — shimming points to balance doors (c) mouldings, covers for finished appearance (d) selection of fasteners
10. Study of Aesthetic Ergonomics	1. Identify concepts within Modern- Contemporary, Colonial and Provincial designs. 2. Identify hardware, joint and material selection. 3. Compare ways to maintain design proportion and balance with: (a) screens, dividers 4. Describe how fixtures affect the aesthetics of millwork. 5. Describe the use of full scale layouts for curved, geometric units.
B. Energy Efficient Construction	**10 Hours**
1. Introduction	1. Describe what Energy Efficient Construction entails and refer to: (a) history of low energy housing and advances in concept and technology (b) active solar gain as a transition technology and why it is no longer appropriate for space conditioning on the prairies
2. Energy Demand	1. Describe how energy is lost from a structure by: (a) conduction (b) convection (c) radiation
3. Control of Air Leakage	1. Describe the functions of the air/vapour barrier. 2. Describe why there may be a need for mechanical ventilation. 3. Identify critical air-leakage locations: (a) basement (b) framing (c) mechanical (d) windows (e) doors 4. State the importance and quality of sealants and stapling. 5. Describe the qualities of acoustical sealant. 6. Describe the uses of weather stripping.

TOPIC	COURSE OBJECTIVES
	7. Describe the function of air-locks.
4. Insulation Materials	1. Identify the following insulations and the uses for each: (a) rigid (b) loose fill (c) batt (d) foam (e) reflective
	2. Describe R.S.I. values.
	3. Describe movable insulation and its uses. (shutters, blinds, storm windows)
5. Wall Configurations	1. Describe the following wall configurations. (a) double wall (b) 38 x 140 wall plus insulating sheathing (c) 38 x 89 wall plus horizontal interior strapping (d) staggered stud wall (e) truss wall (f) stand-off truss (Larson truss) (g) hybrid systems
	2. Describe cross-bracing requirements.
	3. Relate to economics and the following: (a) pay back (b) cost benefit (c) life cycle (d) reference costs
6. Ceilings and Roof	1. Describe possible problems inherent with sloped ceilings and flat roofs.
7. Passive Solar	1. Describe building design with reference to: (a) energy from sunlight (b) south windows as a solar gain (c) need for good design and siting
	2. Describe shading control and overhang design.
	3. Describe the methods used for thermal storage.
	4. Outline the advantages and disadvantages of greenhouse and sunspace alternatives.
C. Renovations and Building Additions	**6 Hours**
1. Typical Procedures and Problems Encoutered in Extending or Adding Additions to Buildings	1. Describe the necessary plumb, square and alignment checks.
	2. Describe how to extend building lines and check for existing services.
	3. Describe how to excavate with reference to: (a) earth removal — material flow (b) minimizing damage to existing landscaping (c) underpinning existing adjacent footings, walls
	4. Describe the requirements for footings and foundation walls including: (a) connections to existing concrete, masonry (b) access openings through existing concrete (c) shoring, bucks, frames
	5. Describe how to provide weather protection.
2. Renovating Interiors	1. Describe the precautions required in disconnection of utilities.
	2. Identify what precautions are to be taken when renovating occupied building.
	3. Describe methods to protect existing floors, cabinets and furnishings.
	4. Describe methods of removal of old material and methods of disposal.
	5. Describe the logical sequence of work schedules.

TOPIC	COURSE OBJECTIVES
D. Stairs	**6 Hours**
1. Stair Systems	1. Describe how to build housed stairs: (a) where used (b) code requirements (c) layout (d) assembly (e) attachment to landings 2. Describe how to build winder stairs: (a) where used (b) code requirements (c) layout (d) assembly (e) attachment to landings 3. Describe how to build circular and spiral stairs of wood and concrete. Describe how to layout forming systems for concrete and layout assembly for wood.
E. Project Organization	**6 Hours**
1. Roles of Others	1. Outline the roles of architects, engineers, contractors, subcontractors and local authorities.
2. Job Scheduling	1. Describe the mechanics of a critical path method of scheduling. 2. Describe bar charts. 3. Describe how scheduling affects other trades.
3. Material Organization	1. Describe reasons for and methods of achieving lead time for procurements. 2. Describe the sequence for delivery and the accommodation on site for: (a) consideration for long or wide components (b) distribution of weights on various slabs, levels (c) access to materials (d) protection from weather (e) security
4. Job Safety	1. Describe job safety with emphasis on: (a) safety committees structure and responsibilities (b) industrial health hazards and illnesses (c) inspections (d) individual responsibilities
F. Individual Concerns	**4 Hours**
1. Carpenter's Role	1. Define the carpenter's role and their attitude as a tradesman and craftsman. 2. Outline opportunities and need for continued upgrading: (a) forming systems (b) site and building layout (c) roof framing (d) new concepts

TOPIC	COURSE OBJECTIVES
SECTION TWO:	**SHOP** **112 Hours**
A. Stairs	**20 Hours**
1. Layout, Cutting and Assembly Systems	1. Prepare housed stringers and stair balustrade. 2. Build winder stairs. 3. Build circular stairs and circular stair form.
B. Interior Finish	**30 Hours**
1. Selected Projects	1. Construct built-on-site cabinets or other units including screens, dividers, storage units. 2. Develop sloping; irregular shapes: (a) displays for store interiors (b) architectural features on building exteriors (c) alcoves, arches (d) decorative louvred panels for window 3. Develop panel work for interiors; mouldings, battens, valances. 4. Prepare jigs, templates for specified operations and full scale layouts. 5. Install a range of hardware: (a) concealed hinges (b) door closers (c) sliding hardware (d) lock-latch sets
C. Energy Efficient Construction	**8 Hours**
NOTE: Due to extensive course material and time lines to Energy Efficient Construction it may be necessary to provide exposure to existing models as opposed to actual construction and personal handskill involvement of apprentices. Methods and procedures may be provided in the form of demonstrations.	
1. Air/Vapour Barrier	1. Identify and describe an air/vapour barrier as per energy efficient standards. 2. Apply: (a) film, foil, paints (b) sealants (c) polypans, vapour hats, beam bags
2. Air Leakage	1. Prepare beams set in concrete. 2. Seal air leakage at floor joists. 3. Install vapour barrier at top plates. 4. Install door and window units. 5. Construct an attic hatch. 6. Prepare cantilever treatment for airtightness. 7. Install (or make provision for) mechanical ventilation from an airtight structure.
3. Trusses	1. Layout a high heeled truss. 2. Layout a scissor truss.
D. Individual Concerns	**32 Hours**
NOTE: As the needs of individual are to be designed and constructed under the direction of instructors.	
	1. Display competence in such suggested areas as: cabinets or fixtures (b) roof layout (c) unequal roof slopes (d) site layout

TOPIC	COURSE OBJECTIVES
	(e) stair work (f) geometric layout
E. Practical Examination	**22 Hours**
	1. Achieve a pass mark in a practical examination project under the following circumstances: — every apprentice will be required to build an in shop practical project. This project will be assessed by representatives from industry and the marks obtained will be a major consideration in awarding completion of apprenticeship and journeyman status.

TOPIC	COURSE OBJECTIVES
SECTION THREE: BLUEPRINT	**56 Hours**
A. Comprehensive Review of Blueprints and Specifications	**36 Hours**
1. Interior and Exterior Treatments for Commercial Building	1. Identify typical dropped ceilings and furred walls and the sections for mechanical concealment, and describe how they are achieved. 2. Describe various elevations and sections for requirements of exterior treatments. 3. Relate to room finish schedules, plans, elevation and reflected views in order to describe interior treatments. 4. Relate to working drawings and exploded views of various interior units to show construction of: (a) stairs (b) storage units (c) dividers, valances, etc. 5. Determine and solve ambiguous sections that may be encountered when interpreting plans and specifications.
2. Blueprints for Other Structures	1. Interpret blueprints for structures other than buildings for appreciation of scope of the carpenter trade.
3. Sequence of Procedures	1. Describe a viable sequence of procedures for a project or procedures for a project or building from start to finish through the study of blueprints.
B. Drawings	**20 Hours**
1. Formal Drawings and Freehand Sketching	1. Prepare plans and pictorial drawings related to design concepts for interior units. 2. Make sketches suitable for communication within industry for: (a) operator of power equipment (b) clarification of procedures with a supervisor (c) clarification of design and procedure with a customer 3. Use drawings to calculate cutting lists for shop projects.

TOPIC	COURSE OBJECTIVES
SECTION FOUR:	**TRADE MATHEMATICS** **24 Hours**
1. Stairs	1. Calculate layout — unit rise, run, headroom and total run. 2. Make calculations for circular stairs. 3. Calculate materials take-off and cutting lists.
2. Quantity Take-off from Blueprints and Drawings	1. Calculate interior components, systems for: (a) wall, ceiling and floor surfaces (b) components — doors, hardware (c) cutting lists for storage rooms or units 2. Select materials to minimize waste for: (a) area, volume and dimensioned materials (b) trim or finish components, etc.
3. Costing	1. Calculate costs of material, labour, equipment rentals and variables such as weather and work stoppages.
4. Applied Geometric Shapes	1. Calculate layout procedures for site. 2. Make calculations for geometrics.

SUGGESTED REFERENCE MATERIALS

Carpentry and Building Construction — S.I. Metric Edition — Feirer, Hutchings and Wilson (Copp Clark Pitman)

Principles and Practices of Heavy Construction — R.C. Smith

Alberta Building Code 1985

A Glossary of Building Terms (Central Mortgage and Housing Corporation)

Metric Roof Framing — P.H. Frederickson

Construction Metric Guide — Domtar Construction Materials
P.O. Box 6138 Montreal, Quebec

Energy Efficient Housing Construction — NHA 5488

Canadian Wood Frame House Construction (Central Mortagage and Housing Corporation)

Occupational Health and Safety Regulations

TECHNICAL TRAINING SCHOOLS

The Carpenter apprenticeship training program is offered by Alberta Manpower, Apprenticeship and Trade Certification. Staff and facilities for teaching the program are supplied by:

1. Northern Alberta Institute of Technology
2. Southern Alberta Institute of Technology
3. Lethbridge Community College
4. Keyano College
5. Lakeland College
6. Fairview College
7. Medicine Hat College
8. Red Deer College

LOCATION OF APPRENTICESHIP AND TRADE CERTIFICATION REGIONAL OFFICES

BONNYVILLE

CALGARY

EDMONTON

FORT McMURRAY

GRANDE PRAIRIE

HINTON

LETHBRIDGE

MEDICINE HAT

PEACE RIVER

RED DEER

VERMILION

GOVERNMENT OF THE PROVINCE OF ALBERTA

ALBERTA REGULATION 304/84

(Filed on September 10, 1984)

MANPOWER DEVELOPMENT ACT

MINISTERIAL ORDER

I, Ernie Isley, Minister of Manpower, pursuant to sections 30(2) and 37(2) of the Manpower Development Act, hereby make the Regulation in the attached Appendix being the Carpenter Trade Regulation.

DATED at Edmonton, Alberta, this 7th day of September, 1984.

ERNIE ISLEY
Minister of Manpower

A P P E N D I X

MANPOWER DEVELOPMENT ACT

Carpenter Trade Regulation

1(1) In this regulation,

(a) "carpenter" means a person who, in accordance with plans and specifications

(i) performs layouts of structures, or components of structures, of wood, wood substitutes or other similar materials, or

(ii) constructs, installs or repairs structures, or components of structures, of wood, wood substitutes or other similar materials using hand or power tools;

(b) "General Regulations" means the General Regulations (Alta. Reg. 43/77) under the *Manpower Development Act;*

(c) "trade" means the trade of carpenter.

(2) The definitions in the General Regulations apply in this regulation.

PART 1

APPRENTICESHIP AND TRADE TRAINING

2 A person is eligible to be an apprentice in the trade if he satisfies the requirements of section 5 of the General Regulations and

(a) produces evidence of at least a grade 9 education or the equivalent, or

(b) passes the entrance examination prescribed by the Board.

3(1) Subject to subsections (2), (3) and (4), an employer who is a journeyman, or employs a journeyman, may employ 1 apprentice and 1 additional apprentice for each additional 2 journeymen he employs.

(2) If the supply of journeymen in a location where an employer is carrying on business is insufficient to permit the employer to carry out his work commitments, the Director may authorize the employer to employ apprentices in addition to those permitted under subsection (1).

(3) The Director may authorize an employer to employ an apprentice, in addition to those permitted under subsections (1) and (2), on a temporary basis to train him in a branch of the trade not engaged in by the employer to whom he is apprenticed.

(4) For the purpose of subsections (1) and (2), an apprentice employed temporarily under subsection (3) shall not be considered to be apprenticed to his temporary employer.

4(1) The term of apprenticeship shall consist of 4 periods of 12 months each.

(2) Each period referred to in subsection (1) shall consist of not less than 1600 hours of employment, including the time spent attending technical courses prescribed by the Board.

5 When a contract of apprenticeship is registered with the Director, he shall issue to the apprentice the official record book referred to in section 14 of the General Regulations.

6(1) An apprentice shall not advance to the next period until the Director has authorized him to do so by making an entry in the apprentice's official record book in accordance with subsection (2).

(2) The Director shall make an entry in the apprentice's official record book authorizing advancement to the next period, when the apprentice

(a) has completed the previous period of apprenticeship,

(b) has received, in the opinion of the Director, a satisfactory report from

(i) his employer, and

(ii) the school at which he attended technical training courses prescribed by the Board,

(c) has completed the tests and examinations prescribed by the Board, and

(d) has attained pass marks prescribed by the Board in the tests and examinations referred to in clause (c).

7 The official record book of an apprentice shall be kept in the possession of his employer, and on termination of the employment of the apprentice, the employer shall present the completed book to him.

8(1) An employer shall pay wages to an apprentice that are not less than the following percentages of the prevailing wages paid to a journeyman:

(a) 60% in the first period;

(b) 70% in the 2nd period;

(c) 80% in the 3rd period;

(d) 90% in the 4th period.

(2) Notwithstanding subsection (1), the wages paid to an apprentice shall not be less than the minimum wage fixed pursuant to the *Employment Standards Act*.

(3) An employer is not required to pay wages to an apprentice during the time the apprentice spends attending technical training courses prescribed by the Board.

9 The hours of work and working conditions of an apprentice shall be the same as those of a journeyman.

PART 2

CERTIFICATION

10 In accordance with section 31(b) of the General Regulations, the Director may issue the following class of certificates in the trade:

(a) Certificate of Qualification.

11 In accordance with section 32(d) of the General Regulations, the Director may issue a Certificate of Qualification for the trade, without examination to a person who holds

(a) a Certificate of Completion of Apprenticeship in the trade issued by another province within Canada prior to January 1, 1961, or

(b) a Certificate of Qualification or a Certificate of Proficiency in the trade issued by another province within Canada, bearing an Interprovincial Standards Red Seal.

12(1) An application to take an examination for a Certificate of Qualification shall be made to the Director.

(2) Documentary evidence acceptable to the Director shall be presented by an applicant for an examination showing that the applicant

(a) holds a certificate equivalent to an Alberta Certificate of Qualification issued by a provincial authority outside Alberta, or

(b) has at least 5 years acceptable work experience in the trade.

(3) The applicant shall provide translations into the English language acceptable to the Director, of credentials other than in English, submitted pursuant to subsection (2).

13 A Certificate of Qualification issued under this regulation is effective unless cancelled or suspended by the Director in accordance with section 42 or 43 of the General Regulations.

14 *The Trade of Carpenter Regulations (Alta. Reg. 239/74) are repealed.*

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